ON THE RELATIONS OF MAN TO THE INFERIOR ANIMALS.*

PROFESSOR HUXLEY has recently published a small volume of essays which seem destined to create no little sensation amongst the British public. Whatever, however, may be its present popularity, it is not a work like Darwin's *Origin of Species*, born to a somewhat enduring fame. Professor Huxley has lost a grand chance of now producing a book which would be for a quarter of a century connected with his name; but instead of writing a serious and painstaking work he has published three very incomplete essays. We are sorry for Professor Huxley's fame that he should have done this; because the time has, perhaps, now come when a great deal of the evidence on this subject could be brought together. However, the work is published, and we must now give our readers some account of its contents. The first chapter is on the natural history of the man-like apes, chiefly taken from Dr. Savage and Mr. Wallace. We then have a note, with a well-known woodcut from Pigafetta, respecting African cannibalism in the sixteenth century. We have only to observe that this is most unnecessarily introduced at this place. Then comes the second, and most important chapter in the book, on the relation of man to the lower animals.

We shall let Professor Huxley, as far as possible, speak for himself. He thus introduces this subject.

"The question of questions for mankind—the problem which underlies all others, and is more deeply interesting than any other—is the ascertainment of the place which Man occupies in nature and of his relations to the universe of things. Whence our race has come; what are the limits of our power over nature, and of nature's power over us; to what goal we are tending; are the problems which present themselves anew and with undiminished interest to every man born into the world. Most of us, shrinking from the difficulties and dangers which beset the seeker after original answers to these riddles, are contented to ignore them altogether, or to smother the investigating spirit under the featherbed of respected and respectable tradition. But, in every age, one or two restless spirits, blessed with that constructive genius, which can only build on a secure foundation, or cursed with the mere spirit of scepticism, are unable to follow in the well-worn and comfortable track of their forefathers and contem-

* *Man's Place in Nature*, by T. H. Huxley, 1863.

poraries, and unmindful of thorns and stumbling-blocks, strike out into paths of their own. The sceptics end in the infidelity which asserts the problem to be insoluble, or in the atheism which denies the existence of any orderly progress and governance of things: the men of genius propound solutions which grow into systems of Theology or of Philosophy, or veiled in musical language which suggests more than it asserts, take the shape of the Poetry of an epoch.

"Each such answer to the great question, invariably asserted by the followers of its propounder, if not by himself, to be complete and final, remains in high authority and esteem, it may be for one century, or it may be for twenty: but, as invariably, Time proves each reply to have been a mere approximation to the truth—tolerable chiefly on account of the ignorance of those by whom it was accepted, and wholly intolerable when tested by the larger knowledge of their successors.

"In a well-worn metaphor, a parallel is drawn between the life of man and the metamorphosis of the caterpillar into the butterfly; but the comparison may be more just as well as more novel, if for its former term we take the mental progress of the race. History shows that the human mind, fed by constant accessions of knowledge, periodically grows too large for its theoretical coverings, and bursts them asunder to appear in new habiliments, as the feeding and growing grub, at intervals, casts its too narrow skin and assumes another, itself but temporary. Truly the imago state of Man seems to be terribly distant, but every moult is a step gained, and of such there have been many.

"Since the revival of learning, whereby the Western races of Europe were enabled to enter upon that progress towards true knowledge, which was commenced by the philosophers of Greece, but was almost arrested in subsequent long ages of intellectual stagnation, or, at most, gyration, the human larva has been feeding vigorously, and moulting in proportion. A skin of some dimension was cast in the sixteenth century, and another towards the end of the eighteenth, while, within the last fifty years, the extraordinary growth of every department of physical science has spread among us mental food of so nutritious and stimulating a character that a new ecdysis seems imminent. But this is a process not unusually accompanied by many throes and some sickness and debility, or, it may be, by graver disturbances; so that every good citizen must feel bound to facilitate the process, and even if he have nothing but a scalpel to work withal, to ease the cracking integument to the best of his ability."

After touching on the development of the lower vertebrate animals, "one turns with impatience to inquire what results are yielded by the study of the development of man. Is he something apart?"

Professor Huxley continues.

"It is quite certain that the Ape which most nearly approaches man, in the totality of its organization, is either the Chimpanzee or the Gorilla; and as it makes no practical difference, for the purposes of

my present argument, which is selected for comparison, on the one hand, with Man, and on the other hand, with the rest of the Primates, I shall select the latter (so far as its organization is known)—as a brute now so celebrated in prose and verse, that all must have heard of him, and have formed some conception of his appearance. I shall take up as many of the most important points of difference between man and this remarkable creature, as the space at my disposal will allow me to discuss, and the necessities of the argument demand; and I shall inquire into the value and magnitude of these differences, when placed side by side with those which separate the Gorilla from other animals of the same order.

"In the general proportions of the body and limbs there is a remarkable difference between the Gorilla and Man, which at once strikes the eye. The Gorilla's brain-case is smaller, its trunk larger, its lower limbs shorter, its upper limbs longer in proportion than those of Man.

"I find that the vertebral column of a full grown Gorilla, in the Museum of the Royal College of Surgeons, measures 27 inches along its anterior curvature, from the upper edge of the atlas, or first vertebra of the neck, to the lower extremity of the sacrum; that the arm, without the hand, is $31\frac{1}{2}$ inches long; that the leg, without the foot, is $26\frac{1}{2}$ inches long; that the hand is $9\frac{1}{4}$ inches long; the foot $11\frac{3}{4}$ inches long.

"In other words, taking the length of the spinal column as 100, the arm equals 115, the leg 96, the hand 36, and the foot 41.

"In the skeleton of a male Bosjesman, in the same collection, the proportions, by the same measurement, to the spinal column, taken as 100, are—the arm 78, the leg 110, the hand 26, and the foot 32. In a woman of the same race the arm is 83, and the leg 120, the hand and foot remaining the same. In a European skeleton I find the arm to be 80, the leg 117, the hand 26, and the foot 35.

"Thus the leg is not so different as it looks as first sight, in its proportions to the spine in the Gorilla and in the Man—being very slightly shorter than the spine in the former, and between 1-10th and 1-5th longer than the spine in the latter. The foot is longer and the hand much longer in the Gorilla; but the great difference is caused by the arms, which are very much longer than the spine in the Gorilla, very much shorter than the spine in Man.

"The question now arises how are the other apes related to the Gorilla in these respects—taking the length of the spine, measured in the same way, at 100. In an adult Chimpanzee, the arm is only 96, the leg 90, the hand 43, the foot 39—so that the hand and the leg depart more from the human proportion and the arm less, while the foot is about the same as in the Gorilla.

"In the Orang, the arms are very much longer than in the Gorilla (122), while the legs are shorter (88); the foot is longer than the hand (52 and 48), and both are much longer in proportion to the spine.

"In the other man-like Apes again, the Gibbons, these proportions are still further altered; the length of the arms being to that of the spinal column as 19 to 11; while the legs are also a third longer than

the spinal column, so as to be longer than in Man, instead of shorter. The hand is half as long as the spinal column, and the foot, shorter than the hand, is about 5-11ths of the length of the spinal column.

"Thus *Hylobates* is as much longer in the arms than the Gorilla, as the Gorilla is longer in the arms than Man; while, on the other hand, it is as much longer in the legs than the Man, as the Man is longer in the legs than the Gorilla, so that it contains within itself the extremest deviations from the average length of both pairs of limbs.

"The Mandrill presents a middle condition, the arms and legs being nearly equal in length, and both being shorter than the spinal column; while hand and foot have nearly the same proportions to one another and to the spine, as in man.

"In the Spider monkey, (*Ateles*) the leg is longer than the spine, and the arm than the leg; and, finally, in that remarkable Lemurine form, the Indri, (*Lichanotus*) the leg is about as long as the spinal column, while the arm is not more than 11-18ths of its length; the hand having rather less and the foot rather more, than one-third the length of the spinal column.

"These examples might be greatly multiplied, but they suffice to show that, in whatever proportion of its limbs the Gorilla differs from Man, the other Apes depart still more widely from the Gorilla and that, consequently, such differences of proportion can have no ordinal value."

After touching on the difference of human crania, the author observes:

"Thus, even in the important matter of cranial capacity, Men differ more widely from one another than they do from the Apes; while the lowest Apes differ as much, in proportion, from the highest, as the latter does from Man. The last proposition is still better illustrated by the study of the modifications which other parts of the cranium undergo in the Simian series."

A comparative examination is then made of the dental characters, the hand, and the foot of man and apes. When speaking of the brain of man, the author observes:

"When the gravest errors respecting points so easily settled as this question respecting the posterior lobes, can be authoritatively propounded, it is no wonder that matters of observation, of no very complex character, but still requiring a certain amount of care, should have fared worse. Any one who cannot see the posterior lobe in an ape's brain is not likely to give a very valuable opinion respecting the posterior cornu or the hippocampus minor. If a man cannot see a church, it is preposterous to take his opinion about its altar-piece or painted window—so that I do not feel bound to enter upon any discussion of these points, but content myself with assuring the reader that the posterior cornu and the hippocampus minor, have now been seen—usually, at least as well developed as in man, and often better—not only in the Chimpanzee, the Orang, and the Gibbon, but in all

the genera of the old world baboons and monkeys, and in most of the new world forms, including the Marmosets.

"In fact, all the abundant and trustworthy evidence (consisting of the results of careful investigations directed to the determination of these very questions, by skilled anatomists), which we now possess, leads to the conviction that, so far from the posterior lobe, the posterior cornu, and the hippocampus minor, being structures peculiar to and characteristic of man, as they have been over and over again asserted to be, even after the publication of the clearest demonstration of the reverse, it is precisely these structures which are the most marked cerebral characters common to man with the apes. They are among the most distinctly Simian peculiarities which the human organism exhibits."

Again, we read.

"So far as cerebral structure goes, therefore, it is clear that Man differs less from the Chimpanzee or the Orang, than these do even from the Monkeys, and that the difference between the brains of the Chimpanzee and of Man is almost insignificant, when compared with that between the Chimpanzee brain and that of a Lemur.

"It must not be overlooked, however, that there is a very striking difference in absolute mass and weight between the lowest human brain and that of the highest ape—a difference which is all the more remarkable when we recollect that a full grown Gorilla is probably pretty nearly twice as heavy as a Bosjesman, or as many an European woman. It may be doubted whether a healthy human adult brain ever weighed less than thirty-one or -two ounces, or that the heaviest Gorilla brain has exceeded twenty ounces.

"This is a very noteworthy circumstance, and doubtless will one day help to furnish an explanation of the great gulf which intervenes between the lowest man and the highest ape in intellectual power; but it has little systematic value, for the simple reason that, as may be concluded from what has already been said respecting cranial capacity, the difference in weight of brain between the highest and the lowest men is far greater, both relatively and absolutely, than that between the lowest man and the highest ape."

On this subject, Professor Huxley makes the following note, which will afford a subject for future discussion.

"I say *help* to furnish: for I by no means believe that it was any original difference of cerebral quality, or quantity, which caused that divergence between the human and the pithecoid stirpes, which has ended in the present enormous gulf between them. It is no doubt perfectly true, in a certain sense, that all difference of function is a result of difference of structure; or, in other words, of difference in the combination of the primary molecular forces of living substance; and, starting from this undeniable axiom, objectors occasionally, and with much seeming plausibility, argue that the vast intellectual chasm between the Ape and Man implies a corresponding structural chasm in the organs of the intellectual functions; so that, it is said, the non-

discovery of such vast differences proves, not that they are absent, but that Science is incompetent to detect them. A very little consideration, however, will, I think, show the fallacy of this reasoning. Its validity hangs upon the assumption, that intellectual power depends altogether on the brain—whereas the brain is only one condition out of many on which intellectual manifestations depend; the others being, chiefly, the organs of the senses and the motor apparatuses, especially those which are concerned in prehension and in the production of articulate speech.

"A man born dumb, notwithstanding his great cerebral mass and his inheritance of strong intellectual instincts, would be capable of few higher intellectual manifestations than an Orang or a Chimpanzee, if he were confined to the society of dumb associates. And yet there might not be the slightest discernible difference between his brain and that of a highly intelligent and cultivated person. The dumbness might be the result of a defective structure of the mouth, or of the tongue, or a mere defective innervation of these parts; or it might result from congenital deafness, caused by some minute defect of the internal ear, which only a careful anatomist could discover.

"The argument, that because there is an immense difference between a Man's intelligence and an Ape's, therefore, there must be an equally immense difference between their brains, appears to me to be about as well based as the reasoning by which one should endeavour to prove that, because there is a 'great gulf' between a watch that keeps accurate time and another that will not go at all, there is therefore a great structural hiatus between the two watches. A hair in the balance-wheel, a little rust on a pinion, a bend in a tooth of the escapement, a something so slight that only the practised eye of the watchmaker can discover it, may be the source of all the difference.

"And believing, as I do, with Cuvier, that the possession of articulate speech is the grand distinctive character of man (whether it be absolutely peculiar to him or not), I find it very easy to comprehend, that some equally inconspicuous structural difference may have been the primary cause of the immeasurable and practically infinite divergence of the Human and the Simian Stirps."

Professor Huxley says, on the origin of species—

"I adopt Mr. Darwin's hypothesis, therefore, subject to the production of proof that physiological species may be produced by selective breeding; just as a physical philosopher may accept the undulatory theory of light, subject to the proof of the existence of the hypothetical ether; or as the chemist adopts the atomic theory, subject to the proof of the existence of atoms; and for exactly the same reasons, namely, that it has an immense amount of primâ facie probability: that it is the only means at present within reach of reducing the chaos of observed facts to order; and lastly, that it is the most powerful instrument of investigation which has been presented to naturalists since the invention of the natural system of classification, and the commencement of the systematic study of embryology."

The following note appears at p. 109.

"It is so rare a pleasure for me to find Professor Owen's opinions in entire accordance with my own, that I cannot forbear from quoting a paragraph which appeared in his essay 'On the Characters, etc., of the Class Mammalia,' in the *Journal of the Proceedings of the Linnean Society of London*, for 1857, but is unaccountably omitted in the 'Reade Lecture,' delivered before the University of Cambridge two years later, which is otherwise nearly a reprint of the paper in question. Professor Owen writes:

"'Not being able to appreciate or conceive of the distinction between the psychical phenomena of a Chimpanzee and of a Bosjesman or of an Aztec, with arrested brain growth, as being of a nature so essential as to preclude a comparison between them, or as being other than a difference of degree, I cannot shut my eyes to the significance of that all-pervading similitude of structure—every tooth, every bone, strictly homologous—which makes the determination of the difference between *Homo* and *Pithecus* the anatomist's difficulty.'

"Surely it is a little singular, that the 'anatomist,' who finds it 'difficult' to 'determine the difference' between *Homo* and *Pithecus*, should yet range them, on anatomical grounds, in distinct subclasses."

This essay is concluded in the following words.

"But desiring, as I do, to reach the wider circle of the intelligent public, it would be unworthy cowardice were I to ignore the repugnance with which the majority of my readers are likely to meet the conclusions to which the most careful and conscientious study I have been able to give to this matter has led me.

"On all sides I shall hear the cry—'We are men and women, not a mere better sort of apes, a little longer in the leg, more compact in the foot, and bigger in brain than your brutal Chimpanzees and Gorillas. The power of knowledge—the conscience of good and evil—the pitiful tenderness of human affections, raise us out of all real fellowship with the brutes, however closely they may seem to approximate us.'

"To this I can only reply that the exclamation would be most just and would have my own entire sympathy, if it were only relevant. But it is not I who seek to base Man's dignity upon his great toe, or insinuate that we are lost if an Ape has a hippocampus minor. On the contrary, I have done my best to sweep away this vanity. I have endeavoured to show that no absolute structural line of demarcation, wider than that between the animals which immediately succeed us in the scale, can be drawn between the animal world and ourselves; and I may add the expression of my belief that the attempt to draw a psychical distinction is equally futile, and that even the highest faculties of feeling and of intellect begin to germinate in lower forms of life. At the same time, no one is more strongly convinced than I am of the vastness of the gulf between civilized man and the brutes; or is more certain that whether *from* them or not, he is assuredly not *of* them. No one is less disposed to think lightly of the present

dignity, or despairingly of the future hopes, of the only consciously intelligent denizen of this world.

"We are indeed told by those who assume the authority in these matters, that the two sets of opinions are incompatible, and that the belief in unity of the origin of man and brutes involves the brutalization and degradation of the former? But is this really so? Could not a sensible child confute, by obvious arguments, the shallow rhetoricians who would force this conclusion upon us? Is it, indeed, true, that the poet, or the philosopher, or the artist whose genius is the glory of his age, is degraded from his high estate by the undoubted historical probability, not to say certainty, that he is the direct descendant of some naked and bestial savage, whose intelligence was just sufficient to make him a little more cunning than the fox, and by so much more dangerous than the tiger? Or is he bound to howl and grovel on all fours because of the wholly unquestionable fact, that he was once an egg, which no ordinary power of discrimination could distinguish from that of a dog? Or is the philanthropist or the saint to give up his endeavours to lead a noble life, because the simplest study of man's nature reveals, at its foundations, all the selfish passions and fierce appetites of the merest quadruped? Is mother-love vile because a hen shows it, or fidelity base because dogs possess it?"

Here follows "A succinct History of the Controversy respecting the Cerebral Structure of Man and the Apes." The statement Professor Owen made in 1857, that "the posterior development is so marked, that anatomists have assigned to that part the character of a third lobe; *it is peculiar to the genus homo, and equally peculiar is the posterior horn of the lateral ventricle and the 'hippocampus minor' which characterize the hind lobe of each hemisphere,*" is shown to be at variance with the opinion expressed by most other anatomists. Professor Huxley denies all three assertions, and concludes with the following statement.

"For the credit of my calling I should be glad to be, hereafter, for ever silent upon it. But, unfortunately, this is a matter upon which, after all that has occurred, no mistake or confusion of terms is possible—and in affirming that the posterior lobe, the posterior cornu, and the hippocampus minor exist in certain Apes, I am stating either that which is true, or that which I must know to be false. The question has thus become one of personal veracity. For myself, I will accept no other issue than this, grave as it is, to the present controversy."

We will not enter here into the propriety of inserting these remarks, because we are hardly able to enter into the feelings of the author. At first sight, they appear wanting in good taste; but we are inclined to believe that the author is justified in what he has said. It has been affirmed that this is a personal quarrel, but whatever may be its cause, there can be no doubt it is a most melancholy dispute.

Surely passion has enough fields for exhibition without being introduced into scientific discussion. If we believed this was a personal question, we should do all we could to expose the originator. But it is a matter of fact, opinion, and meaning of words. We hope that the Anthropological Society will appoint an independent (?) committee to report on the real facts of the case, and do their best to put a stop to this unfortunate dispute. But let these quarrels be a warning to all young men. Let them all know that there must be the same honesty in scientific discussions as in any other affairs of life. The scientific man cannot serve two masters. Nor is science in any way advanced by such attempts. On the contrary, a false statement of facts may retard the progress of science for years. What time has not been wasted respecting this dispute! Professor Owen is charged with stating that which he knows to be false. No doubt this is a serious charge: and were it possible for Professor Huxley to demonstrate its truth, we should neither attempt to justify or extenuate it. We take no part either on one side or the other in this dispute; but are bound to give our opinion that at the present time the evidence is chiefly on the side of Professor Huxley respecting the question of facts, unless Professor Owen can show that the meaning of his words has been misinterpreted.

An interesting chapter follows "On some Fossil Remains of Man," principally relating to the Engis and Neanderthal skulls, taken chiefly from Schmerling and Schaaffhausen. This chapter throws very little light on man's place in nature, and there is nothing in these skulls which may not now be found amongst existing savage races.

Professor Huxley makes the following very sensible remark respecting the present state of craniometry in this country.

"Until human crania have been largely worked out in a manner similar to that here suggested—until it shall be an opprobrium to an ethnological collection to possess a single skull which is not bisected longitudinally—until the angles and measurements here mentioned, together with a number of others of which I cannot speak in this place, are determined, and tabulated with reference to the basicranial axis as unity, for large numbers of skulls of the different races of Mankind, I do not think we shall have any very safe basis for that ethnological craniology which aspires to give the anatomical characters of the crania of the different Races of Mankind."

The author is not content with making these observations, but must go on to make the following dangerous generalization.

"At present I believe that the general outlines of what may be safely said upon that subject may be summed up in a very few words.

Draw a line on a globe from the Gold Coast in Western Africa to the steppes of Tartary. At the southern and western end of that line there live the most dolichocephalic, prognathous, curly-haired, dark-skinned of men—the true Negroes. At the northern and eastern end of the same line there live the most brachycephalic, orthognathous, straight-haired, yellow-skinned of men—the Tartars and Calmucks. The two ends of this imaginary line are indeed, so to speak, ethnological antipodes. A line drawn at right angles, or nearly so, to this polar line through Europe and Southern Asia to Hindostan, would give us a sort of equator, around which round-headed, oval-headed, and oblong-headed, prognathous and orthognathous, fair and dark races, but none possessing the excessively marked characters of Calmuck or Negro—group themselves.

"It is worthy of notice that the regions of the antipodal races are antipodal in climate, the greatest contrast the world affords, perhaps, being that between the damp, hot, steaming, alluvial coast plains of the West Coast of Africa and the arid, elevated steppes and plateaux of Central Asia, bitterly cold in winter, and as far from the sea as any part of the world can be.

"From Central Asia eastward to the Pacific Islands and subcontinents on the one hand, and to America on the other, brachycephaly and orthognathism gradually diminish, and are replaced by dolichocephaly and prognathism, less, however, on the American Continent (throughout the whole length of which a rounded type of skull prevails largely, but not exclusively) than in the Pacific region, where, at length, on the Australian Continent and in the adjacent islands, the oblong skull, the projecting jaws, und the dark skin reappear; with so much departure, in other respects, from the Negro type, that ethnologists assign to these people the special title of 'Negritoes.'"

Professor Huxley concludes the work by asking three questions, which time alone can answer.

"Where, then, must we look for primæval Man? Was the oldest *Homo sapiens* pliocene or miocene, or yet more ancient? In still older strata do the fossilized bones of an Ape more anthropoid, or a Man more pithecoid, than any yet known, await the researches of some unborn paleontologist?"

Such, then, are specimens of the contents of a book which is destined to exercise no small amount of influence on the popular mind. It is not every man who is both able and willing to write on such a subject in such a way that the public shall be both interested and enlightened. Perhaps, however, the day is not come for a scientific work on such a subject. Therefore, the book is very properly called "*evidence*" as to man's place in nature, and, as such, it is a most valuable compilation. There is much, however, omitted which might have been introduced. This will all come in good time. Like all Professor Huxley's writings, it is clear in style, and decided

in expression. We have not dwelt on the most important point, the *arguments* from the facts adduced; but these will be ample food for discussion at some future day. Professor Huxley shares the weakness of his opponents in wishing to make some rigid distinction between man and animals. The other day, at Cambridge, he spoke of the "mental and moral gulf;" now he believes with Cuvier that the distinction is "articulate speech." We fear that Professor Huxley will have to yield this too as easily—if, indeed, not more easily—than his opponents will have to give up the structural difference. Making the distinction to be "articulate speech," is a sort of "refuge for the destitute,"—a bone thrown to a savage dog.

Professor Huxley seems to have had his conscience pricked when he wrote, "the possession of articulate speech is the grand distinctive character of man," for he adds in parenthesis, "*whether it be absolutely peculiar to man or not.*" We should like to know what is the difference between the "distinctive" character and the "grand distinctive" character? and how articulate speech can be a *distinctive* character at all, if it is not absolutely peculiar to man?

Would it not be better to assert at once that "written language" is the "grand distinctive character"? The only misfortune for such an hypothesis is the fact that some races of man have no written language. We have no hesitation in asserting that Professor Owen's "posterior third lobe," "posterior cornu," and "hippocampus minor," are as "grand distinctive characters" of man as Professor Huxley's "articulate speech." We would advise Professor Huxley to be cautious not to say anything more about the "grand distinctive character," because there really is no such thing: no amount of difference in degree ever amounting to the same thing as a difference in kind.